

**Responses to: International Space Station Utilization Management  
Request for Information**

September 16, 2003

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### **Introductory/General:**

- Firmly believes that the concept of a non-government organization NGO formed for the implementation and management of research to be performed utilizing the International Space Station is the appropriate and most effective approach for achieving maximum benefit for the user community and the public.
- Strongly endorses NASA's intent to establish an Institute to manage and facilitate the pursuit of ISS research
- Concur fully with the need for an Institute to supply leadership for, and representation of, the broad existing and potential ISS user communities - Science, Technology, and Commercial.
- We appreciate the effort and persistence shown by NASA in general, and by the Office of Biological and Physical Research in particular, in pursuing effective and efficient use of the tremendous research potential of the ISS. We further believe that the extensive studies leading to the selection of a non-profit institute have arrived at a partnership concept and attainable initial approach that have the potential to measurably improve the productive research utilization of this unique space asset.
- Those of use in the research community believe that if the ISS Research Institute were already in place, it would be performing a major role in conducting outreach, and advocating and promoting the development of the most valuable and innovative projects.
- We consider this RFI an important step toward enhancing the overall utilization of the space station by the science, technology, and commercial research communities and are eager to pursue this opportunity and, to bring our experience and expertise to bear on this initiative for NASA.
- We would like to compliment NASA for incorporating some key functions of other existing NASA Institutes into this RFI. This includes the proposed Institute's role in the strategic planning, peer review, educational outreach, data archives and data processes. It also includes the provision to permit the Institute's staff to conduct independent research activities. The latter is a key element of a successful personnel recruitment and retention policy.
- It is essential that the Institute provide NASA with independent, unbiased advice based on the ISS utilization community's needs.
- The community and NASA will not be well served by an Institute that is merely a support contractor.

- It is important for the success of the ISS research program that NASA and the Institute, in partnership, ensure that the Institute can provide a focus and a conduit for ISS users in the planning and on-orbit conduct of their experiments.
- The Institute must add substantial value to ISS utilization and one of the important responsibilities of the Institute will be to work on behalf of ISS researchers to minimize effort, time and cost associated with conducting flight research.
- Enthusiastically supports the concept of a Non-Government, Organization (NGO), designated as the International Space Station Research Institute (ISSRI), as the management vehicle most likely to maximize the quality of research using the ISS while reducing the overall research cost.
- An ISSRI offers the-prospect of affording a user-friendly source of technical aid and assistance, reducing the number of organizational interfaces involved and thus simplifying access, and advocating system improvement and process simplification for their benefit.
- Believe that the most effective utilization of the ISS will ultimately depend not only on the selection of the best research but also by having in place the most streamlined process for planning, development, integration and flight certification.
- The ISSRI can play a dominant role by working with NASA and the users to eliminate time & cost obstacles in this process while assuring that safety is an integral aspect of each step in the research formulation.
- Highly beneficial for research utilization to have an in-house engineering expertise available at the ISSRI. The primary goals would be:
  - a) to keep up with all engineering or operational changes being made to the ISS either by NASA or its International partners,
  - b) to serve as an advocate for customers to recommend process changes or system improvements to NASA based on an integrated view of the research utilization,
  - c) to aid and assist both PT's and GI's to plan research and traverse the implementation process in order to maximize the potential for success and minimize user frustration, and
  - d) to provide NASA an independent source of expertise for improving systems engineering in general and facility utilization specifically.
- The RFI states that the proposed NGO needs to become a research leader to a diverse user community. The FY2001 national map of the distribution of NASA Biological and Physical Research documents a virtual black hole of PI-led research in the Inland Northwest The document geographically lists a total of 830 researchers-four states in the region have no researchers. Suggestion: The RFP should require the NGO to include non-traditional and underserved regions of the nation in the implementation plan to insure a diverse user community. The plan should also have requirements to include non-traditional populations like Alaskan Native, Native American, Hispanic and others.

- Based on our review of the RFI, it is still hard to see the correlation between the stated Phase I roles and responsibilities for the proposed Institute outlined in Table I and the stated "improvements" contained in the NRC task group report referenced on page two of the RFI. This linkage is critical to the ability of the Institute to meet user needs and requirements, as well as achieve NASA's objective. We recommend the Agency correlate the functional responsibilities allocated to the Institute on Table I to the authority and responsibility required to meet NASA's requirement to enhance customer services, increase user process efficiencies, and reduce cycle times.
- In the forthcoming SOW, the Agency needs to be clear as to the improvements anticipated in Phase I, as well as the additional improvements that will be anticipated should there be a decision to proceed with the Phase 2 portion of the program.
- It is important for NASA to provide feedback on the responses of the interested parties to the RFI. This is the second RFI issued by NASA, and all parties would benefit from structured responses to the issues and questions that have been tabled. To accomplish that end, we recommend that NASA schedule an "Interested Parties Day" where inputs and issues are openly and clearly addressed by key NASA personnel.

## **Objectives**

- The RFI references the 2002 NASA Internal Study on ISS Utilization Management Concepts that listed "three governing objectives" for an NGO. These objectives were necessarily broad because they were to be used as a basis to examine and compare a variety, of management concepts and models for overseeing ISS utilization. These objectives derived from three recurring themes and other perceptions that had contributed to criticisms by the user community of the support by NASA and in particular the Shuttle and ISS Programs. However, none of these objectives provide a hard focus on remedying the faults of the system as perceived by the user communities and reinforced by all studies to date. These issues might be summarized as dealing with schedule, allocation of assets, prioritization of payloads, duplication of requirements, conflicting requirements, authority for acceptable performance risk, and the value of time.

The RFI notes that "meeting those (the three) objectives would lead to a number of improvements with respect to the Space Shuttle and ISS (sic. Spacelab) programs," however, the objectives do not include addressing researcher perceived issues. A fourth objective should be added which would address the underlying issues that were the impetus for establishing an NGO. This would be: "The Ultimate goal of the Institute is to transition authority to the Institute for the allocation of all resources, assets, and priorities for science, technology, and commercial utilization for the U.S. allocated portion of the ISS. This would include all decisions on performance risks not related to safety." This last point relating to responsibility for performance risks is perhaps the most essential element affecting the timeline for flight authorization and hardware development costs. Indeed, it goes to the heart

of the concerns most often expressed by the research community. Until the researcher (whose intellectual concept has been peer reviewed and selected for funding) is given the final authority over all matters (except safety) related to her/his research conduct, cutting edge scientists with cutting edge science projects will not be forthcoming. The philosophy within NASA has long been that public monies are being expended in support of the research and, therefore, NASA cannot permit the experiment to progress unless NASA employees are satisfied that the experiment will work perfectly for all elements of the experiment. The flaw in this philosophy is in the assumption that the funds being expended are NASA funds. They are not. They are taxpayer funds. They were not appropriated to carry out activities of interest to NASA personnel at performance levels satisfactory to NASA personnel. They were appropriated to support the intellectual pursuits of competitively selected independent researchers and are made available through NASA for the conduct of the work. The role of NASA in such matters should be to provide the facilities and access to them to enable the conduct of the research to achieve the objectives of the researcher in a timely manner and at the level of risk tolerance acceptable to the researcher. One wants cutting edge research participation on the ISS, whether in basic science, human space exploration, technology development, or commercial applications, the time template for access to flight remains a most critical parameter. This is doable only if processes are effectively streamlined and this is given the highest priority by those empowered to do so. Cutting edge science will not be proposed until evidence shows that time and timely access are critical and that failure to achieve timelines for the research has consequences to those responsible. I suggest this is the most important of the objectives since it would empower the Institute (which is to be the advocate for the best research by the best and brightest) to determine when an experiment is ready to fly.

### **Customer Advocacy and Support**

- Believe that a core capability for systems engineering needs to be available to provide professional users and to fully understand all technical implications of using the ISS. Knowledgeable technical support allows for optimal ISS resource allocation within operational and physical constraints while being mindful of health & safety concerns.
- A central source of end-to-end engineering expertise with a user perspective can be brought to bear for anticipating and avoiding problems in the early formulation of the research, its development and, most importantly, its passage through the physical integration and flight certification process. This should dramatically reduce the cost and difficulty for access and consequently enhance the attractiveness of doing ISS research.
- An important technical consideration for streamlining and simplifying the research utilization is having available within the ISSRI a current source for reference information - physical specifications and performance capabilities - to support utilization planning and implementation.

- A truly valuable aspect of this ISSRI engineering capability will be the depth of understanding of the actual physical environment with special emphasis on operations and physical (thermal, power, etc.) limitations and constraints.
- The ISSRI, if it has a meaningful in-house engineering expertise, can be a valuable independent resource for NASA's use in implementing organizational re-invention (or process improvement). It provides an integrated user perspective regarding process deficiencies.
- The multitude of research facilities aboard the ISS present a daunting interface problem for new customers wishing to understand how best the ISS can be utilized to meet their research objectives. A "Users Guide" is necessary but inadequate. Here the ISSRI, if it remains actively involved in tracking engineering developments for ISS, can serve as a readily identifiable source of information to provide guidance in the planning of new research programs. This service is greatly enhanced if the ISSRI maintains liaison with the engineering organizations of the international partner in order to simplify researcher involvement with the use of these non-US resources.
- If NASA technical organizations "respect" the expertise of the ISS Institute, then the more effective will be its advocacy in regards to process change recommendations.
- Technical expertise clearly exists throughout NASA but it is highly distributed appropriate expertise at the ISS Institute serves as a consolidated source for easy customer access and facilitates a systems perspective. This technical expertise will be necessary to manage the GI program as well; it is analogous to that provided by the Instrument Scientists residing at the HST Science Institute.
- The technical experts serve to provide independent feasibility assessments to OBPR regarding new research proposals and support in-house analysis of any independent commercial proposals for use of ISS.
- As envisioned, the Institute will have very limited authority. Advocating excellence through change without the authority to implement the change results in only the authority to advocate, and in being the target for criticism for failure to "fix the problem" if the advocacy has not been followed by NASA. User feedback, while beneficial at some level, will not establish the cause of dissatisfaction (or satisfaction) unless selected very carefully with in-depth, personal interaction. Since the "system" which will serve the users will be a mix of NASA (several groups), contractors, and the Institute, researcher feedback should be solicited, compiled, and gauged by an independent group.
- The RFI notes that the Institute is intended to "establish and maintain a customer support interface" that is "intended to be a focused, comprehensive point of entry for obtaining information regarding ISS capabilities and research opportunities," and will also "integrate and represent unique and common customer requirements to the ESS Payloads Office." If the Institute is intended to be a one-stop shop and single point of entry for all domestic users of the ISS, including NASA users, as well as users of US space station assets, this point needs

to be clearly stated. If the Institute's role is not intended to be that broad, for example, the Institute is intended to provide these functions only for users of the new Guest Investigator Program - that also needs to be clarified. This is a key issue and one that must be addressed since it greatly impacts the relationship of the Institute to the user, as well as to existing NASA institutes and research partnership centers.

### **Research Selection, Payload Manifesting, and Payload Flight Processes**

- Within the NASA Peer Review process, NASA and the contractor perform different functions for different grant solicitations, depending on the preference of the NASA customer and on the requirements of the specific solicitations. For each grant solicitation, NASA always:
  - a) Approves the solicitation announcement before it is distributed,
  - b) Approves the proposal reviewers, and
  - c) Performs the selection decision for grant or contract award

Items 1 and 3 are viewed as inherently governmental functions, while item 2 is a matter of NASA preference. All other peer review and grant acquisition functions or services on a given grant solicitation may be provided by the contractor based on the Task Order request by the NASA customer. The RFP needs to clearly delineate the differing roles assigned to NASA and to the contractor. In areas where NASA doesn't reserve the explicit right to perform the function, the contractor should be free to propose to assume the role.

- The NASA Peer Review Process is a mature robust process that is easily modified to conform to particular needs of an Institute for ISS Research Management, or for other Government agencies. It is the least risk approach to supporting the solicitation and selection process envisioned for the Institute. The RFP should place the responsibility for proposing the solicitation selection process on the proposer.
- Institute must play a strong role in optimizing the selection and timing of flight experiments. In particular, the Institute, in partnership with NASA, must be able to manifest and fly payloads with minimal time delay to:
  - a) attract and support the highest quality and highest priority scientific, technology and commercial research at all times;
  - b) conduct a robust, high quality Guest Investigator program;
  - c) rapidly re-fly high-priority research where the experiment equipment or operations failed on orbit, or where unexpected or particularly interesting results warrant rapid reaction; and, more generally, to "shorten selection-to-flight cycle times".
- We understand that NASA's payload manifesting process is currently undergoing revision. We strongly urge that the new process retain a high degree of flexibility and that the Institute, when in place, be strongly involved in continued efforts to improve the payload manifesting process, as further process improvements are likely to result from community feedback to the Institute.

- In respect to payload solicitation, selection, prioritization, and flight, we want to reinforce and recommend that:
  - a) The Institute, as representative of the user communities, must be a substantial partner with NASA to solicit, select and prioritize research to be flown on the ISS consistent with NASA's strategic plan. The Institute should propose and implement processes that minimize time delays in selecting and subsequent manifesting of flight research.
  - b) The Institute, on behalf of the user communities, should have a seat at the table with NASA and associated contractors when decisions are made concerning the integration and operation of ISS payloads. Recommendations made by the Institute on behalf of the users for ISS process and system improvements for research utilization should carry significant weight.

### **Commercial Programs**

- The RFI clearly delineates the three separate commercial areas in a way that permits clear definitions of the market segments. For companies in categories (a) and (c), the understanding of the value of an ISS experiment and the technical issues are quite clear to the companies. For companies in category (b), this is generally not the case. As noted, their interest is not space but the results to be derived from the space experiment. It is for this reason that they work with intermediaries. A trusting confidence must develop between the company and the intermediaries. Inserting an additional group to which business plans, market analyses, and critical technology must be divulged is imposing the most significant of impediments to the development of such participants. Because of this, the RFP should not spell out this specific process. It should rather note that the Institute must propose a process that will provide an assessment of the proposed flight experiments. Each proposer could then determine, as a first step, the process most acceptable, using inputs from those companies currently participating with the RPC's.
- The RFI specifically requests comment on the proper role the Institute should have regarding Commercial Programs. Of the three categories of Commercial Programs as set forth in the RFI, the companies in group (a) are generally seeking markets to utilize their aerospace expertise. They are independent activities without any coordination. In this area the Institute, would likely benefit from a formal relationship with as many of these companies as possible. This could be in the form of periodic meetings (perhaps twice annually) to exchange information. Companies in category (c) are also independent, perhaps even more so than the aerospace companies. These are unlikely to be willing to be a part of a "group".

Activities in category (b) provide the only coherent collaboration. At the same time, the FY04 budget proposal of the Administration, if enacted, will greatly weaken this group since almost all this activity is contained within the Research Partnership Centers (formerly the Commercial Space Centers). The experience base and lessons learned to date cannot be immediately replicated within the Institute without the participation of the experienced Directors and their staffs. Each existing RPC owes its success to its unique circumstances,

its approach, and its leadership. Because of the differences, the value of the total effort is, as sometimes noted, greater than the sum of its parts. As written, the RFI implies that the use of the ISS for knowledge to enable commercial development is an integral responsibility of the Institute. The RFP should recognize the uniqueness of this asset of experience and talent. The Institute should utilize it to the maximum extent possible to insure that commercial benefit derives from the ISS.

### **Liaisons and Interfaces**

- It is essential for the Institute to work closely with all the stakeholders in the ISS program - not only the diverse user communities, but the related NASA research enterprises, NASA operations elements and their contractors, the international partners, etc.
- The RFI asks the Institute to help foster cross-disciplinary, inter-agency, and international, flight research programs and identify potential strategic alliances in alignment with NASA's strategic objectives. In order to accomplish this:
  - a) The SOW should encourage the Institute to directly establish liaisons and working partnerships with all potential ISS research and/or operations organizations.
  - b) The Institute should provide the scientific representation for on-orbit operations planning, operational resource allocation, research execution and operational replanning.
- Based on the RFI, it is not clear if the proposed Institute only supports Code U, Office of Biological and Physical Research (OBPR), or if it also supports the other NASA enterprises that are, or eventually could be, involved with space station utilization. The RFP will need to discuss the nature of that relationship - contractual, advisory, as well as how the proposed Institute will interface with the Space Station Program Office, other key NASA labs, and space station contractors. The RFI only briefly addresses these issues with a reference under "Customer Support" related to representing customer requirements. Based on the proposed role of the Institute in the management of space station utilization for scientific, technical, and commercial research, it would seem practical that it should support all user organizations, the interfaces should be well defined, and the roles and responsibilities clearly identified.
- In order to "increase the long-range Productivity of S/T/C research and development aboard the ISS," it would appear that the scope of the Institute's functions would have to be broader, not narrower. If that is correct, it might be a mistake to establish a senior management team only from the ISS User Enterprises as it appears in the plan from the RFI. Additional benefit would most definitely be obtained from adding representatives from other governmental users, as well as external user groups and research organizations. Key to the enhanced utilization of the space station is the active engagement of the broadest possible user community in all activities associated with space station utilization. This would be comparable to the active participation of the astronomy community in the utilization of the Hubble Space Telescope.

- It is not clear how the roles and responsibilities of the proposed Institute are aligned with the advisory roles and responsibilities of the existing NASA Advisory Committee, BPRAC, and its Space Station Utilization Advisory Subcommittee. The makeup and relationship of the proposed OBPR Commercial Evaluation Board to these entities also needs to be clarified. In many areas a potential for duplication and overlap exists. It also is not clear whether the proposed Executive Director of the Institute will be a member of the existing advisory boards (BPRAC and SSUAS), staff of the existing advisory board, or a key advisor to the existing advisory board. Based on our review of various options, we recommend that you consider the Institute as the key advisory group for users and permit the Institute to establish its own advisory board. We also think that would enable the Institute to fulfill its role as a "major forum for the academic, government, and private sectors." This issue needs further clarification in the SOW. We also recommend that NASA further assess whether the proposed set of roles and relationships creates any FACA issues.
- It is our belief that the proposed ISSRI should be "the" one-stop shop for all domestic users of the space station, as well as foreign users of US space station, as well as foreign users of US space station research assets. Toward that end, the existing institutes and research centers should be incorporated over time into the proposed ISSRI contract so that it is the "Institute of Institutes." We recommend that with the expiration of an existing contract for an existing institute or research partnership center, the new contract fall under the jurisdiction of the ISSRI. This approach does not mean that the provider of the service would be terminated although, with the passage of time, contracts could be recompeted and the focus of activity changed. It would mean that the contractual agreement for those services would flow from the ISSRI to the existing institute or center, and not from Code U. However, Code U would still be the funding entity for the ISSRI and, as such, would maintain the "power of the purse" and be intimately involved in discussions and negotiations concerning the overall suite of user Institutes, centers, and capabilities required. In this manner, the ISSRI could ensure that it is the one-stop shop for all users and that the overall quality and range of services would be consistent throughout the system.

The ISSRI would serve as key interface to the NASA space station organizations and the existing institutes and centers would be the key interfaces in the near term with the NASA centers. The ISSRI would be responsible for optimizing the use of assets and for the alignment of space station user resources with required research foci and market needs. In that manner the Institute would ensure focus on the key research domains, and commercial users would receive consistent treatment regardless of what partnership center they went to for services. Based on the fact that NASA currently invests in a microgravity institute, a fluid physics and combustion institute, a space-based biological research institute, and an astrobiology institute, one could suggest that the initial focus of the ISSRI be in other domains so as to complement and optimize previously made investments in facilities and human resources. Later, as the ISSRI gains experience and demonstrates capability, these existing institutes should also fall within the operational scope of the ISSRI. We would be pleased to have an opportunity to openly discuss this issue with NASA and other potential bidders since it believes this is a fundamental issue that must be resolved before the Agency releases an RFP.

- Existing Institutes have been (in general) established to promote specific research disciplines. While development of flight experiments to support this research is a part of their charter, their role has only been to promote the discipline. Their charge has not been to maximize utilization of the ISS. The Institute should be charged with maintaining close contact with and awareness of the programs of these Institutes. Through this Interaction the Institute can assess the level of the ongoing research in comparison with other fields. This will be essential in order for the Institute to provide well-informed input to the NASA review process on new initiatives.

### **Oversight, Metrics, and Performance Evaluation**

- As noted in the RFI, the NASA task group listed important operational objectives for the research support organization, including:
  - Enhanced understanding of and sensitivity to research users and uses;
  - Shorter selection-to-flight cycle times; Lower end-to-end investigation costs;
  - Streamlined processes and procedures; and
  - Simpler investigator interfaces for initiation and conduct of research activities.
 The responsibilities and authority of the Institute as described in the RFI do not appear to include many tasks that would be necessary to accomplish all these objectives. While the research leadership and advocacy functions assigned to the Institute can address the first and part of the last objective, the RFI gives the Institute no direct responsibility or authority over tasks that could materially affect selection-to-flight times, lower end-to-end investigation costs, and streamline many processes. We enthusiastically endorse giving the Institute responsibility to conduct studies and suggest process improvements. Nonetheless, if not given the authority to approve or implement such improvements, the Phase 1 Institute cannot be evaluated based on the full set of objectives.
- The Institute performance should be evaluated by its user community using metrics based on its scope of responsibilities.
- To provide the desired research leadership and advocacy and adequately represent the ISS user community, the Institute must provide independent advice to NASA and not be regarded as just a “support contractor.”
- We understand that NASA will provide strategic direction to the Institute via a senior management team comprised of ISS User Enterprises, with semi-annual reports to this team being the basis for assessing the ISS and the Institute. The user communities must also take responsibility for the Institute's performance.
- An independent Institute based in the research and technology communities must be responsible to these communities and be evaluated and overseen by them. This community governance should be integrated with NASA oversight of the Institute.

- As noted in the RFI, the “focus of this acquisition is on managing research utilization of the world's first continuously operating, full-service research and development complex in space” with three specific objectives in mind (1) facilitating the pursuit of flight research, (2) optimizing research opportunities within current capabilities of the ISS, and (3) increasing the long-range productivity of S/TIC research on the ISS. The Agency also notes in the RFI that it will develop metrics to track the Institute's responsibilities in research, strategic planning, customer support, advocacy solicitation and selection, concept studies, guest investigator program, etc.

As NASA works to formulate the Statement of Work, it is important for potential bidders to better understand what metrics will be used to assess performance of the Institute in each of these areas, and what the baseline assumptions will be concerning access to space station, crew time, on-orbit power, availability of guest investigator hardware, etc. We recommend that NASA clearly define these metrics at the front end so that prospective bidders can better understand the challenges, risks, and performance measures.

- It also needs to be clear as to how NASA will garner user inputs in these assessments since the Institute needs to be highly customer/user focused if the overall goals of the Agency and the NRC Report are to be met.
- Realistically, metrics can only be applied to those who are empowered. NASA should delineate in the RFP those areas where the Institute will be empowered, how the empowerment will be determined, and when it would be expected to occur. Metrics should relate to successfully achieving objectives where the Institute is empowered to implement the items required to be measured.
- Because the Institute must rely heavily on NASA organizations in many areas that are critical to research results, the institute needs an independent third party to whom it can address problems it perceives are arising due to breakdowns of the NASA system. This Independent reviewer could identify the causes of perceived problems and bring immediate attention to them.
- Once NASA moves in the direction towards an institute, it can ill afford to reverse the process at some later date. Defining the performance metrics that NASA should use to assess the progress and success of the institute endeavor is as critical as defining the functions to be performed by the institute. Establishing the process to be used to assess that performance against those metrics will define how well the institute focuses on the breadth (Science/Technology/Commercial) of the institute charter. There are at least two sets of customers for the institute: (1) NASA and (2) the Science/Technology/Commercial user community served by the institute.

The Performance Evaluation Plan for the Institute would need to force the Institute to view these diverse "customers" as having equal value in receiving the support of the Institute. The role of the Institute is broader than supporting the development of the OBPR Strategic Roadmap. Were one of these customer groups to receive greater benefit from the Institute's

ISS Utilization Management activities than other categories of customers, the overall benefit of the Institute in supporting NASA's goals and objectives would be lessened. Nonetheless, supporting the development of an OBPR Strategic Roadmap is important. Performance metrics unique to each "customer" must be designed to adequately gauge Institute success in fulfilling its charter for that customer. An integration scheme for aggregating the performance results from the diverse customer base would need to be designed to ensure the Institute focuses equally on performance of all critical tasks assigned to it by NASA. One technique is to create a performance threshold for a number of metrics spanning all customers such that should anyone of the metrics fall below the threshold, significant impact to the actual incentive few would result, regardless of the aggregate performance score achieved for all benchmark metrics. Another scheme would recognize the difficulties inherent with mobilization and transition, with a weighted set of metrics for early Phase I, giving way to a "desired level of business performance" approach.

- The RFP should place the responsibility for proposing the Performance Evaluation Plan on the proposer.

### **Conflicts of Interest**

- The RFI indicates a number of Phase 1 Institute tasks that may involve industry subcontractors. Responsibilities of the possible Phase II Institute such as "integrated, research payload operations" will necessitate even greater industry participation. These industry contractors will have substantial experience in matters of ISS utilization, and could provide substantial added value to ISS users in developing experiments.
- The industry subcontractors of the Institute should be allowed to design and build experiment hardware for ISS users, subject to normal open competition processes and Conflict of Interest (COI) considerations.
- It is critical that there be no conflict of interest within the contractor organization. Often agencies choose to prohibit the contractor from participating in grant-funded research to avoid such conflicts. Under such a scenario, only organizations that do not perform research would be able to bid for ISS Utilization Management if peer review support is an integral part of the contract. This would leave NASA with a choice from among less than fully qualified contractors. We believe the preferred option for NASA would be the application of a robust Organizational Conflict of Interest (OCI) Avoidance Plan as part of the ISS Utilization Management contract. We have developed and use a NASA-approved, proven, OCI Avoidance Plan that effectively prevents conflicts real or perceived. The RFP should place the responsibility for proposing an OCI Avoidance Plan on the proposer.

### **Technology Support**

- Technology can benefit grant processes from electronic solicitation and proposal submission to virtual panels. Costs associated with travel and lodging are considerable. If a large

technology requirement is envisioned to support the grant solicitation and award process, a contractor will need to be able to provide technical and computer support along with the other aspects of peer review. The RFP should place the responsibility for defining how the full range of solicitation and selection tasks will be supported using e-commerce approaches/techniques.

### **E-government/E-commerce Considerations**

- NASA is aware of the current and evolving requirements for Federal agencies with regard to solicitations, proposals, and grants while composing this solicitation. The RFI makes no note of any overriding government-wide initiative that must be taken in consideration by the proposer in order for the proposal to have any relevance to the information technology imperative within the federal government.

### **Contract**

- *The RFI Summary* states: "The awardee must have direct and diverse experience in the management of laboratories and development test beds for both basic and applied research across the academic, industrial, and governmental sectors."

The RFI notes that the purpose of the Institute "is to seek the most effective and efficient approach to managing research utilization of the ISS system, while maximizing productivity within physical and fiscal constraints" and that it is to be "a research leader with the ability to achieve and sustain research progress while providing intellectual leadership to the diverse user communities."

The RFI further *notes that* there are precedents for such an Institute and cites the Hubble Space Telescope Science Institute as an example. At the time of the Hubble Institute procurement, much of what is indicated above relative to the expected role of the Institute was also included. But the requirement of an experienced entity such as is noted in the current RFI was not included. Indeed, the winning team in that procurement was developed specifically to respond to the Hubble Institute RFP. Applying this requirement as a part of a solicitation for an Institute does not appear to be justified based on the purpose of the Institute and the limitations in role and scope to managing the planning and utilization of the ISS research but without control of ISS systems and operations. Indeed, such a limitation severely limits responses to a relatively small number of relatively large organizations, especially when the not-for-profit status is included. I would recommend removing such a constraint. Because of the complex interactive role of the Institute with the operational elements of the ISS (and the Shuttle) and because of the advocacy and leadership roles expected of the Institute, the key to the success of the Institute will depend upon the individuals comprising the Institute, not the experience of the organization in managing laboratories and test beds. Permit, as was done with the Hubble Institute, new organizations created just to meet this need to be given full consideration.

- We concur with the concept of implementing the Institute's responsibilities via a time-phased transition, allowing the Institute to demonstrate its ability to assume leadership.
- The timing and proposed duration of Phase 1 raise several concerns. The duration of the initial contract period must be long enough to allow the Institute to build up a staff and attain a scope of responsibilities on which its performance can be adequately evaluated. The suggested 4-year duration of the contract may not be enough "to attract Phase 1 offers, allow Phase 1 performance to stabilize, and incorporate lessons learned from Phase 1 into a potential Phase 2 contract" as per the RFI.
- The initial contract should be long enough for the Institute to attract and retain the outstanding scientific and technical staff necessary for its success, the "best and the brightest" in NASA's words. Institute staff must actively engage in competitively awarded research. If the Institute is truly to attract an outstanding staff, it must offer attractive career possibilities and some level of job security to compete for researchers having tenured positions in academia. A four-year contract, even with a fifth year option, is not long to attract such tenured staff.
- The ISS is already being used to conduct research, even while still being assembled. Ideally, the Institute should become effective in achieving the objectives identified in the RFI as soon as possible. Thus, we believe that the timing of the start-up of the Institute should be carefully considered. According to the RFI, the Institute is planned to start in October 2004. Serious recruiting for staff cannot begin until the competition is finished. Even if proposed key staff members are committed to the Institute, they must have time to transition. The starting date has particular impact on people who work on an academic schedule. Commitments for fall employment are generally made by the end of the previous spring. Moving in late summer is extremely disruptive of family life, since options for housing, schools, etc. are less plentiful. Announcing the successful bidder for the Institute in the spring would have substantial benefits in attracting the necessary first rank staff.
- We also urge NASA to plan some modest funding for the Institute in late FY04. This would greatly facilitate start-up and early recruitment activities and allow the Institute to start productive work at the beginning of FY05. This would also prevent startup delays that might occur in FY05 due to the increasingly common occurrence of continuing budget resolutions in Congress.
- At the time of the expected RFP, in Fall 2003, it is possible that a firm schedule for return to flight will not yet have been established, and that the dates of planned completion of U.S. and International ISS Core will not be known. Until ISS construction is complete, the amount of up-mass and crew time available for research payloads will remain limited. Although the Institute should be established as soon as possible, to start adding value to ISS utilization and to focus the research community's innovative ideas for ISS utilization, implementing new concepts will be much more meaningful in the post-construction period. Tying the duration of the initial contract to the achievement of full ISS assembly would allow the Institute to be

evaluated on the basis of "maximizing productivity" during a period of more mature ISS operations.

- A further challenge to establishing an Institute would be the absence of plans for phasing it out if NASA does not renew the contract, or for continuing the Phase 1 Institute if NASA decides not to proceed with Phase 2.
- We suggest reconsidering the initial length of contract, the renewal and recompetition process, and the date of announcing the successful Institute contract:
  - a) The initial period of performance should be the greater of 5 years or assembly complete +2 years. We note that this is consistent with the guideline for a 5-year base period for an Institute given in NASA document NPG 5000.1, "Establishing a Science and Research Institute."
  - b) NASA should structure the contract with renewable options, each of perhaps 5 years, in the event NASA chooses not to greatly expand the scope of the Institute via a full Phase 2. This is also consistent with the guidelines in NPG 5000.1. Any decision to terminate the Institute contract should allow for a phase-out period of at least one year.
  - c) NASA should decide on and announce the Institute awardee in the spring of 2004, or as soon as possible, and provide modest start-up funding in FY 2004 to facilitate recruiting highly qualified Institute staff to start work in Fall 2004.
- It is important that the Statement of Work scheduled to be released in the June/July timeframe clarify the overall budget funding profile for the Institute, the scope of activities included within the Institute, the proposed ramp up of activities, etc.
- As noted in each and every report that assessed the proposed Institute, it is time to put an International Space Station Research Institute in place. The sooner the Agency makes the Institute a reality, and the more engaged users are in the formulation of key processes and procedures, the better off users will be and the more successful space based research will be. We strongly recommend that the proposed schedule for the Institute contract be accelerated to the summer of 2004, the proposed time frame for awarding the contract.
- People and organizational responsibilities are the keys to the success in transitioning any functions from one group to another. Proposals should be required to include not only the organizational structure of the proposed Institute, but also specific organizational teaming or contractual relationships intended, but also the specific identities of all key personnel to be responsible for the primary activities of the Institute and related organizations. In addition, the proposal should certify that any proposed organizational relationships have been agreed to and that agreements have been finalized between the proposing organization and all key individuals identified in the proposal, and furthermore these agreements are written and in the files of the proposer.

Once the RFP is finalized and published, potential proposers and participants can clearly understand what is required and can develop the team and personnel necessary to demonstrate their competence to successfully carry out the work of the Institute. Developing such agreements, especially between organizations and institutions, requires time. This should be acknowledged by the procurement and adequate time provided between the issuance of the RFP and the proposal due date in order to finalize such agreements. Experience indicates achieving such agreements and commitments requires from six to nine months on average. Therefore the time allowed for proposal development following announcement of the RFP should be no less than 180 days. To further justify this extended period, it should be noted that the pace of transition development of functions to the Institute as suggested in the RFI is expected to be slow. There should be no time urgency to receipt of proposals. The suggested agreements and commitments will provide the clearest possible picture to the proposal evaluation team, possibly reducing uncertainties relative to comparison of proposals. This could, in turn, shorten the time required to evaluate proposals.

In addition, if such agreements are not finalized prior to proposal submission, they must be developed after contract award. The time required to achieve these agreements and to establish critical personnel in place will still be substantial. Costs associated with these activities will be allocated to the Institute. Full attention of the Institute to the tasks of the Institute will be delayed. And relationships and personnel included in the proposals may not be achieved in negotiations after the award, thus requiring changes from the proposal. These may be substantive and which, if considered during proposal review, might alter the comparative ratings of proposals.

The importance of the proposed Institute to the conduct of the broadest and best science, technology, and applications is very significant, not only to the research community but to the credibility of NASA. Providing ample time for the above will maximize the potential for success of the Institute.

- We recommend that NASA make past performance and the introduction of innovative ideas, concepts, and approaches a key factor in the evaluation of the submitted proposals and the overall assessment of the bids. We further recommend that the past performance of potential prime contractors in working collaboratively with for-profit firms be evaluated. This element of the evaluation would in-effect address the feasibility of the eventual transition to Phase 2 and the expansion of the Institute's role to include key engineering and integration roles and responsibilities. As noted in the RFI, NASA is in search of an "awardee that must have direct and diverse experience in the management of laboratories and developmental test beds for both basic and applied research across the academic, industrial, and government sectors." We agree with that goal and believe that the proposed contacting mechanism should clearly state this objective.
- The projected solicitation proposes to establish an Institute with the capabilities to produce the desired effects. The success or failure of such an organization depends on the personnel to be involved, including their experiences and results previously achieved. It does not depend upon individual names or names of the host institution(s). Therefore, the direct

experience of a specific organization and its management team are relevant. The names of affiliated organizations should have no weight except where those organizations are proposed to have specific Institute responsibilities through the qualifications of named key personnel.

- Key institutional relationships and critical personnel should be identified and written agreements certified to be in place.
- Cost sharing should be encouraged and the impact of such on the capabilities of the Institute should be evaluated.
- Demonstrated successful experience of proposed key personnel for the organizational responsibilities envisioned should be clearly delineated.
- As to the initial transitional period of the contract, we agree that a time-phased series of transitions is a responsible way to initiate the Institute effort. However, it will be vital for each potential bidder to understand what is included in each set of functions and in which order they will need to be demonstrated. In short, the intended scope and phasing of the Institute needs to be defined as precisely as possible in the RFP to increase the potential for competitive, comparable, and responsive proposals.
- The proposed creation of an ISS Research Institute involves a significant degree of risk for any bidder. These risks are of two types: (1) risks associated with creating an Institute with an evolving set of roles and responsibilities and the expansion of its proposed capabilities from 100 to 350 people, and (2) risks associated with the current resource constraints and access issues related to research on the space station.

Based on our assessment of these risks, we recommend that the proposed contractual mechanism should be performance based, at least five years in duration, and should adequately reward the successful contractor for the cost-effective execution of its roles and responsibilities. At a minimum, the contract should be fee bearing and structured with incentives for the contractor to achieve the most important results desired by NASA. The fee should be aligned with the risks taken by the contractor and provide a potential fee in the range of 8 to 10 percent.

- We recommend that NASA provide bidders with the opportunity to submit innovative investment mechanisms including reinvestment of earned fee to enhance utilization of the space station and to better address user requirements.
- Customer satisfaction is an important component of the NASA Peer Review program. Experience has shown that structuring award fees and incentives to include customer satisfaction is particularly effective and would complement the effectiveness of the Institute for ISS Utilization Management.

The need for the institute to conduct competitively awarded and/or self-directed research is inherent with the NASA charter for the Institute to provide independent leadership for, and representation of, the entire S/TIC community, while attracting and retaining scientific and

technical staff. This requires that funding be made available to the Institute to support such research, funding that is viewed by the research community as a reduction in funding available for the research community as a whole. The incentive for the Institute to exceed NASA's performance expectations needs to be substantial in order to promote long-term success. An incentive award fee system based on 8% would be sufficient to stimulate such extra effort. Since NASA is looking towards a not-for-profit approach to the Institute, the award fee would be the basis for a self-fulfilling prophecy if it were to be used by the Institute solely to fund research by the Institute staff; for Independent Research & Development (IR&D) activities of the Institute, and/or SBIR/STTR-like research and technology development activities by the Institute. The Institute would have to place the "customer" first in order to fund the complementary work of its staff.

The incentive fee would need to adequately balance the performance against specific Institute metrics established by NASA and the various "customers" served by the Institute:

- NASA Enterprise Associate Administrators
- NASA Associate Administrator for Biological and Physical Research (in particular)
- NASA Advisory Committee/Subcommittees (OBPR-related)
- Scientific Research Community as represented by Principal Investigators using the ISS
- Technology Research Community as represented by Principal Investigators using the ISS
- Commercial Research Community as represented by Principal Investigators using the ISS

Documented and auditable evaluation (feedback) as to the performance of the Institute in support of these diverse "customers" should be the core of an incentive awards program. The RFP should place the responsibility for proposing an incentive awards plan and performance evaluation plan on the proposer.

- The RFI indicates that the Institute will "participate with NASA" in developing recommendations for operations, for strategic planning etc. It further refers to "the transition of work" that will "take place as a time phased series of transitions." The term "transition of work" is not sufficiently specific to permit a proposer to plan for this. The RFP needs to be very specific relative to the work intended to achieve transition. The work that is expected to be a measure of the success of the Institute needs to be enumerated in the RFP. Additions can be made to this list over time through mutual agreement.
- The greatest benefactors of an Institute that effectively advocates for excellent research, stimulates broader researcher involvement and causes all elements of NASA to better serve the researcher needs will be the researches and their host institutions. These institutions frequently cost share the support of research because of its intrinsic value to the host institution. The evaluation criteria should provide for an assessment of the degree of investment commitment (cost sharing) by proposers that seek to host the Institute.